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GAS LIGHT JOURNAL

FIFTY-EIGHTH YEAR

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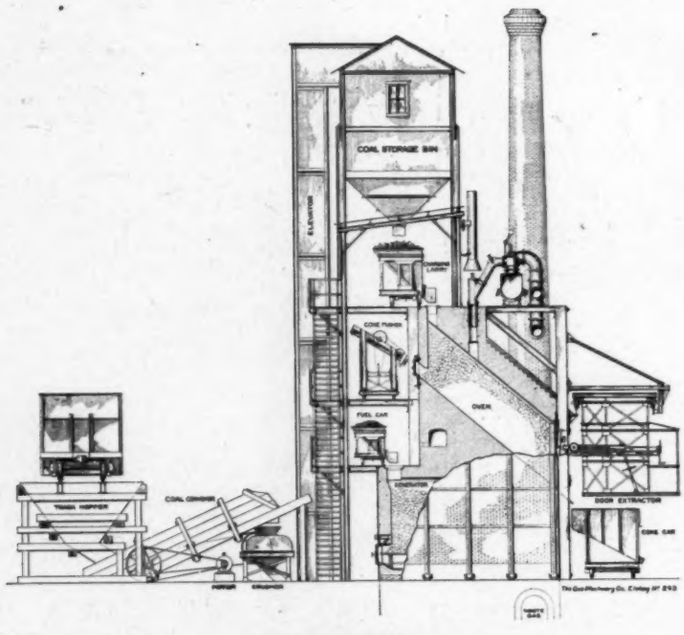

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1859 FIFTY-EIGHTH YEAR 1916

AMERICAN

GAS LIGHT JOURNAL

VOL. CV., No. 13. NEW YORK, SEPTEMBER 25, 1916 WHOLE No. 3,054.

Welsbach Lamp Represents Most Radical Advance in Light Production Made Through all the Ages Declares Charles P. Steinmetz.

In Presidential Address Before Illuminating Engineering Society in Convention at Philadelphia, Electrical Expert Discusses Present Aspect and Future Prospects of Light Production—Sessions Marked by Excellence of Arrangements for Looking After Convenience and Comfort of Members and Guests

From the standpoint of interest evoked, the presidential address of Charles P. Steinmetz predominated all else at the first day's session of the annual convention of the Illuminating Engineering Society at the Bellevue-Stratford Hotel, Philadelphia, Sept. 18-20. Dr. Steinmetz discussed at length the present and future aspects of light production, and declared that the Welsbach lamp represents the most radical advance in illuminating engineering and light production throughout all the ages. The future advance in incandescent lighting efficiency will be, in his opinion, in per cents instead of in hundreds of per cents. It would be of interest, he suggested, to study the efficiency of the magnesium flame, and to investigate at what price per pound of magnesium, burning magnesium as combustible, would become economically competitive as a light producer with the hydrocarbon flame.

Automobile Trip for Ladies Delayed to Give Them Opportunity to hear Dr. Steinmetz Speak

The excellence of the arrangements made for the comfort and convenience of the visiting members and guests, and to make them feel at ease and at home was one of the outstanding features throughout the convention. More than 375 persons were assembled at the first day's sessions.

Because of their desire to hear Dr. Steinmetz speak, the scheduled automobile trip for the ladies was delayed until late in the morning. During the first day's sessions C. H. French and C. J. Van Giesen, of the Public Service Electric Corporation of New Jersey, presented their paper on "Gas and Electric Lighting in the Home," in which dual systems for all residences were advocated. "Gas Illumination of the Philadelphia Civic Exposition," by C. S. Snyder and F. H. Gilpin, of the United Gas Improvement Company, of Philadelphia, was the first paper presented at the second day's session. The scheduled paper on "Industrial Lighting by Gas," by J. D. Lee, also of the United Gas Improvement Company, was not read at the convention.

Extracts from Address of President Steinmetz

The following pertinent extracts have been taken from the address of Dr. C. P. Steinmetz:

All illuminating engineering necessarily centers around the light source, the radiator in which radiant energy is produced from some other form of energy, and the efficiency of the radiator to a considerable extent dominates the success of an illuminating engineering installation.

This is of pre-eminent importance.

Controlling the efficiency of the radiator are the same general laws governing the efficiency of energy transformation which are implied in the term "general"; that is, the efficiency of transformation of energy is a function of the degradation or appreciation of energy by transformation. It is a function of the similarity of the two forms of energy between which the transformation occurs; that means, in a transformation from a higher to a lower form of energy, that extremely high efficiency is possible. In a transformation between forms of energy of similar quality, such as mechanical energy and electrical energy, very good efficiencies are still possible, but the transformation of a low grade energy, such as heat energy, to a high grade energy such as mechanical energy, inherently must be very inefficient.

The more similar the forms of energy, the higher the efficiencies that are possible. Thus the transformation between electrical and kinetic energy can reach extremely high efficiency.

The result of this is that where we have to transform from some such form of energy as chemical energy in the flames, or electrical energy in the electric radiators, into another form of energy, in our case radiant energy.

Heat energy is a low grade energy. Therefore, while transforming from chemical energy to heat energy by combustion, we reach high efficiency. In transforming from heat energy to mechanical energy in the form of thermo-dynamic energy, we are limited to low efficiency and the resultant transformation efficiency thus remains low. Heat energy might be termed a disorderly energy. Therefore, all energy transformations toward heat energy are highly efficient. Radiant energy and electro-kinetic energy are probably the highest forms of energy. They are the only two forms in which energy is independent of matter carried by space.

This radiant energy as the ultimate goal means therefore that we may not be able, even ultimately, to reach as high efficiency as we reach in transforming between electrical and kinetic energy, for instance, but with this chemical energy or electrical energy, as a starting point, if we do not go down or up, we should be able to get reasonable efficiencies.

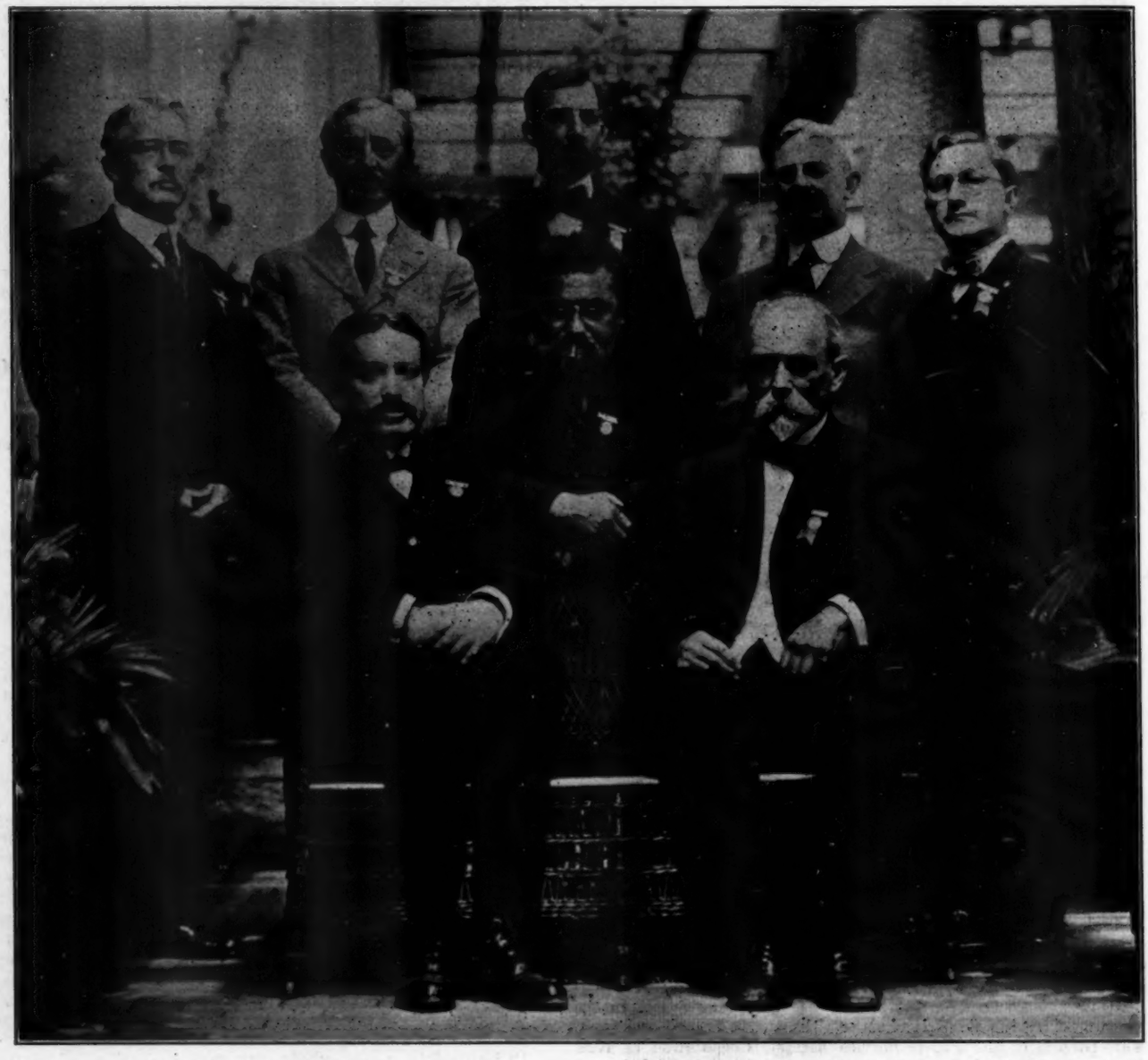
Unfortunately, up to within our own generation, all methods of production of light—radiant energy—have been with heat energy as an intermediary form, and we are therefore limited inherently to the very low efficiencies possible in a transformation of energy from a low grade to high grade energy. It is only in our own generation that a somewhat more direct transformation has been discovered, and the first break with the temperature law of radiation was a source of heat energy in its industrial application.

The Welsbach Lamp

Probably the most radical advance in illuminating engineering and light production that has been made through all the ages was probably in the Welsbach lamp. It was the first time, outside of the temperature law, that energy had been conducted into radiation.

To-day we have a number of methods of light production which are not based directly on heat as an intermediate form. But still, to-day, lighting, especially electric lighting, is based on the temperature radiation, and in the field of temperature radiation or incandescent lighting, we probably may consider the highest development of to-day, the highest efficiency of temperature radiators or illuminators are represented by the acetylene flame and the gas filled mazda lamp.

In the last fifteen years enormous advances have been made in increasing the efficiency of temperature radiation, and increasing the incandescent lamp from four watts per candle power up to the present lamp with less than half a watt per mean spherical candle power.



Photograph by Philadelphia Evening Ledger Staff Photographer.

DR. CHARLES P. STEINMETZ, ELECTRICAL EXPERT WHO CHARACTERIZED WELSBACH LAMPS AS MOST RADICAL ADVANCE IN ILLUMINATION ENGINEERING THROUGHOUT THE AGES, STANDS LEANING ON CHAIR IN CENTER OF GROUP

It is not probable that the advance in temperature radiation in the near future will be anywhere near as radical. It is probable, in my opinion, that future advance in incandescent lighting will be rather by per cents and not, as in the last fifteen years, by hundreds of per cents. In short, I believe that we are approaching the limits of efficiency possible under the temperature radiation law.

The temperature possible with hydro-carbon gases or vapor as a source of chemical energy, necessarily is limited by the dissociation temperature of oxides of carbon, and hydrogen in the acetylene flame. We are not far from those temperatures.

In material, higher efficiency than given by the acetylene flame in light production under temperature radiation is not probable, except by using a radiator, using a combustible the oxide of which has a much higher dissociation temperature, such, for instance, as metallic magnesia. As a result of the present war, the commercial manufacture of magnesia has been developed to a considerable extent and it is quite likely that after the war, when normal conditions have returned, magnesia may be available at prices comparable with those of aluminum.

It would therefore be of interest to further study the efficiency of the burning magnesium flame and investigate at what price per pound of magnesia, burning magnesium, as combustible, would become economically competitive as a light producer with the hydro-carbon flame. It is by no means impossible that if we realize such low prices of magnesia as appear possible under normal conditions, that magnesium as a combustible in flame lighting, would come within the economic range due to its very high efficiency.

Chemical Luminescence is Perhaps Not Temperature Radiation

Perhaps, after we have defined it broadly enough, chemical luminescence is not temperature radiation, because there is no temperature at which the radiation of a body would give a spectrum like that of the Welsbach mantle, because, at the temperature of the burning flame, these oxides, when heated electrically or protected from the flame gases, do not luminesce.

Whatever the reason is, whether it is the luminescence at the temperature of the burning flame or a radiation at very much higher temperatures locally, relieved by the flame gases in the pores of the luminescent material, it is a selective radiation produced in the focus of an intense chemical reaction.

It has the characteristics of florescent radiation, that is radiation by one material excited by and attending upon a small radiation of another exciting material, just as calcium sulphide phosphoresces due to the presence of a small amount of seria.

Many Unique Piping Systems Developed in Connection With the Gas Illumination of the Philadelphia Civic Exposition

Lights Grouped in Eighty 4-Lamp Clusters Arranged in 10 Longitudinal Rows—Installation of Piping System a Tedious and Difficult Undertaking—Two-Inch By-Pass Insured Against Interruption to Gas Supply

Due to the large area to be illuminated and the unusual requirements for lighting the interior walls of the booths, there were developed many unique piping systems in connection with the gas illumination of the Philadelphia Civic Exposition, held in the auditorium of the Philadelphia Commercial Museum, May 15-June 10. The lamps and fixtures were designed to furnish a definite illumination at each booth and a uniform illumination over the area outside the booths, and were installed in ten horizontal rows of eight 4-lamp clusters. In a paper presented before the Illuminating Engineering Society, Sept. 19, at its annual convention held in Philadelphia, C. S. Synder and F. H. Gilpin, of the United Gas Improvement Company, described the work as follows:

Building 295 Ft. Wide By 301 Ft. Long

The building is a large one-story shed-like structure 295 ft. wide by 301 ft. long having three longitudinal center bays of 60 ft. span and 35 ft. clear height to the bottom chord to the roof truss and two outer bays of less height. The outside walls are of brick painted light buff, and the roof of weather-stained wood. Daylight illumination was obtained by numerous long narrow windows in the side walls.

ILLUMINATION OF PART OF THE BOOTH SECTION

The entire floor space of the area, though somewhat broken up by the pillars supporting the roof trusses, was divided more or less symmetrically into a large number of unit sections or booths for the exhibits. The partitions between sections were portable screens generally about 7½ ft. high by 10 or 12 ft. long, but in many cases several sections were combined by the removal of the intervening screens for the use of a single exhibition. In one small area, in the southwest portion of the room, these partitions were 10 ft. high. There were also numerous exhibits of such a special nature that their height and all other dimensions were indefinite and variable.

The general color of all the screens was light buff. Although a few of the exhibits had special individual lighting by gas or electricity, by far the greater part of the area was illuminated by the main gas installation. The general lay-out of the entire area is shown in the accompanying diagram.

After it had been decided that gas was to be used for the general illumination, calculations showed that the most satisfactory results would be obtainable by the use of a Welsbach No. 2076 lamp equipped with a No. 228 plain opal shade.

Inasmuch as it required 320 such units, piping considerations (the supply lines being 35 ft. above the floor) necessitated the grouping of the lamps into eighty clusters of four lamps each.

These clusters were arranged in ten longitudinal rows of eight clusters each spaced symmetrically with their mantle centers 20 ft. above the floor. One extra cluster of four lamps was placed over a balcony that was used as a bandstand.

Installation of Piping System a Tedious and Difficult Undertaking

The installation of the piping system was a tedious and difficult undertaking, particularly so with the three center bays, in which the bottom chords of the roof trussses were 35 ft. clear height above the floor. The bottom chords of the trusses in the two outer bays were 25 ft. clear height above the floor.

The gas service was located at the north wall and very close to the center of the building. From this location the main feeding line was run south following, alongside one of the roof trusses to which they were securely strapped and fastened. This main feeding line started with 4 in. pipe and was gradually reduced to 1½ in. pipe as the various branches were taken off. This main feeding line was run a little larger than necessary as there was some question whether gas would not be needed for exhibition purposes in some of the booths.

Ten lines running east and west were taken off the main feeding line and outlets left so that the eighty drops were approximately 39 ft. apart, east and west, and 30 ft. apart, north and south. The roof trusses in the bays were 20 ft. between centers, and, therefore, the six lines in the high bays were run with 1½-in. pipe so as to reduce the tendency to sag. The ¾-in. drops in these bays were approximately 13 ft. long and this piping together with the fittings and lights put quite a weight on the 1½-in. lines. The four lines in the outer bays were made of 1¼-in. pipe as the ¾-in. drops were only 3 ft. long.

ILLUMINATION OF CENTRAL PASSAGEWAY

Practically All of Piping Rested on Top of Chords of Roof Trusses

All of the pipe between the various outlets was cut to length, screwed together and then hoisted to the top of the portable scaffold. Practically all of the piping rested on the top of the chords of the roof trusses so that there was no danger of any of the pipe dropping on account of loose straps, etc. The hardest work was experienced in running the main feeding line on account of the large size and the great height at which it had to be placed.

To aid in installing the piping system, there was constructed two large portable scaffolds, 32 ft. high, 6 by 6-ft. at the bottom and tapering to 4 by 4-ft. at the top. The four posts of the scaffold consisted of 4 by 4-in. lumber securely bolted and strapped together with 1 in. by 6 in. boards.

On the top of each scaffold was a working platform 4 by 4-ft. covered with 2-in. planking. Under each post was rigidly attached a heavy ball-bearing castor.

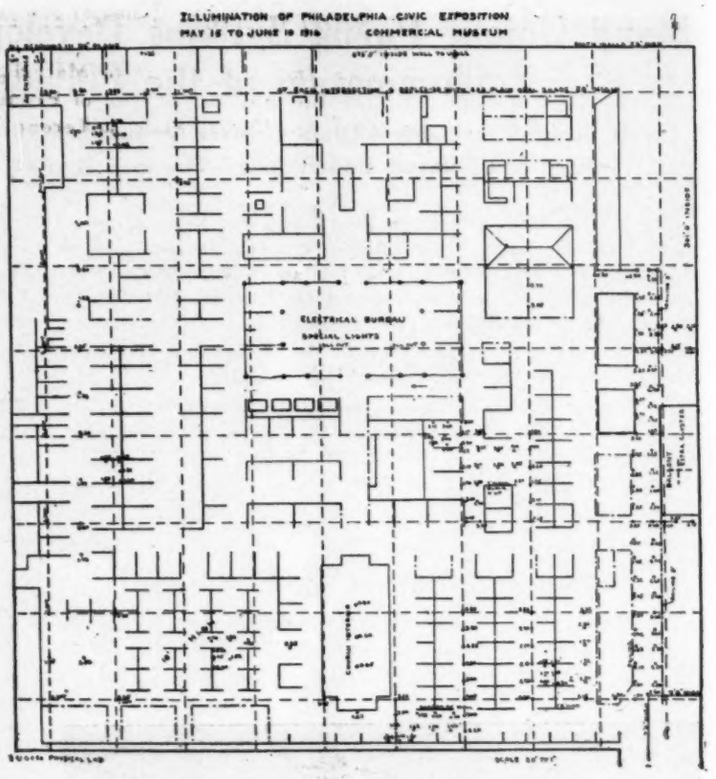
Similar scaffolds 22 ft. high were used for the outer bays. These portable scaffolds were easily moved about, and it was not necessary for the men working on the platform to come down when the scaffold was being moved. Strips of wood were securely fastened to one of the posts to serve as a ladder.

At the bottom of each drop, a 5-way ¾-in. fitting was used, and the lights were hung 12 in. from the center of the drop.

All of the work with the exception of trimming a few lights was completed in five days. On account of the great amount of district work at this season of the year, it was not possible to force the work very much during the day, but at night from seven to twelve o'clock, the best men in the district were put on.

A gas meter capable of recording 3,400 cu. ft. of gas per hour was installed, and a 2-in. by-pass run around it, so that if anything happened to the meter the supply of gas would not be interrupted. On account of the short time available to complete the work, and as all the piping was exposed, it was not found practicable to test the piping with air as it was being installed. Care was taken, however, to see that no split fittings or pipe were used and that all joints were made up tight. After all the lamps were hung, the gas was turned on and the system found practically tight. The chain on each lamp was lengthened 6 ft., so that they could be easily lighted or extinguished with a hook pole about 7 ft. long.

A remarkable feature of the installation was that in trimming 324 No. 2076 lamps, no leaks were found and no stoppages or defects encountered. At no time during the exposition were any of these lamps taken down on account of defects.



LIGHTING PLAN AND GENERAL LAYOUT

Illumination Data

For the illumination measurements a plane 3 ft. from the floor was selected as representing the average height at which most of the exhibition lay-outs would be viewed.

In addition the sides of each partition were completely covered with charts and photographs of the various articles which constituted a great part of the exhibition.

Owing to the presence of the exhibits and partitions between the sections it was found practically impossible to lay-out any one section typical of the whole where a complete system of readings could be obtained without interference either by material obstruction on the floor or obstruction of the light by the partitions.

Series of readings were, therefore, taken in various localities where the illumination appeared to be generally typical of the entire area.

During the time of taking illumination measurements the average consumption per lamp as determined by the meter was 9.3 cu. ft. per hour representing for 320 lamps, 2,976 cu. ft. per hour for the entire area of 88,795 sq. ft. or 29.8 sq. ft. per cubic foot of gas per hour (0.0336 cu. ft. per square foot area). By obtaining the mean of several similar representative unobstructed sets of observation points, the average illumination for the entire area was determined as 2.84 lumens per square foot or a total light flux of $2.84 \times 88,795 = 252,178$ lumens. Assuming 17.5×12.56 lumens per cubic foot available from the lamps, the total lumens emitted are $17.5 \times 12.56 \times 2,976 = 654,125$ lumens. This results in an utilization efficiency of 38.6 per cent.

One of the outstanding features of the installation is the uniformity of the lighting. To the eye it appears absolutely uniform, and the readings taken show that, except for spots when the direct light from the adjacent fixtures is entirely obstructed by the division screens, the minimum is over 30 per cent of the maximum and 53 per cent of the mean. The suspension height of the lamps removes practically all sources from the direct field of vision with the result that the entire area appears to be very brilliantly lighted.

Gas Glower Most Striking Innovation of the Year in Ignition Developments

Engineers have long been seeking a more satisfactory method of ignition than those at present in use and the most striking innovation of the year has been the development of a gas glower for the purpose, states the committee on progress of the Illuminating Engineering Society in its annual report. This consists of a bundle, cylindrical in form, about one-quarter of an inch in diameter and of about the same length, made up of several thousand filaments made from rare earth material, similar to that used in incandescent mantles. Gas is delivered to the center of the mass and combustion takes place throughout, but with greatest intensity at the top. The device consumes approximately one-twenty-fifth of a cu. ft. per hour, or 350 cu. ft. per year, which is about one-half that consumed by the ordinary pilot flame of a residential burner.

Four General Conditions Determine Cost of Manufacturing Gas

As Outlined by H. W. Douglas, They are: Price of Materials Used, Efficiency Obtained from These Materials, the Cost of Labor and the Investment Per Unit of Production—Circulation of Heat in Bench at Remodelled Ann Arbor Plant Different from Anything Hitherto Built

Four general conditions determine the cost of manufacturing gas, according to H. W. Douglas, manager of the Washtenaw Gas Company, of Ann Arbor, Mich., in a paper presented at the annual meeting of the Michigan Gas Association, held in Detroit, Sept. 21 to 22. These factors are: Price of materials used, efficiency of results obtained from them, the cost of labor and the investment per unit of production.

Reduction in Labor Cost Most Promising Point of Attack

The first of these conditions is beyond the control of those interested in its use. In the second, the limit of efficiency as to results obtained from the coal, seems to have been practically reached with the present silica retorts.

There remains then, if we reduce our manufacturing cost, some method of reducing the labor cost which will not involve an expenditure per unit of production, the interest and depreciation on which will not be beyond the saving affected, and with this in view, the writer made a study of the various methods of carbonizing coal now in use.

The situation which presented itself to the Ann Arbor plant was a necessary renewal of at least three benches of sixes with a desired increase of capacity. The buildings were in excellent condition and the balance of the benches and plant good for a number of years' effective use, but it was desirable that a general plan for the future be adopted with a type of installation which could be continued as further bench renewals were required.

The type to be adopted must reduce the number of men employed, to provide lighter work than the hand charging and drawing of retorts in order that men may be retained in employment even at high prices, and to use as large a percentage as possible of practically unskilled labor.

Types Considered

The following types of installation were given consideration:

First. Renewal of the present stop-end benches, the operating results of which were used as a basis of comparison with other types.

Second. Through retorts, 12 ft. long, with a hand operated pusher and charged by hand. Investigations of plants using this type of bench convinced the writer that the saving in labor in discharging the retorts by means of the pusher was more than made up by the poor results obtained in charging by hand any retort over 9 ft. long and the necessity of highly skilled stokers to get even moderate results in charging a long retort, charging machines being out of the question in a small-sized plant on account of the high investment.

Third. Inclined retorts or inclined oven retorts presented all of the advantages in the way of saving of labor and the class of general labor required, but meant a complete change of buildings with great inconvenience and very high initial cost. Vertical retorts were not seriously considered, being of too large units and too high cost, too problematical in results and incompatible with the balance of the plant.

Horizontal Oven Retorts Selected

The installation of horizontal oven retorts were finally decided upon.

Three benches of oven were built on foundations occupied by former benches of sixes, the foundation being slightly widened so that it now occupies a space of 34¾ ft. by 13⅝ ft., and each bench consists of three ovens, 6 ft. high by 12 ft. long by 12 in. wide occupying the same retort house space as before, the only change in the building being that the back wall has been removed.

These ovens are heated by a standard type three-quarter depth furnace, having a grate area slightly larger than the standard, the grate being 31½ in. wide by 5⅓ ft. long.

The heat passes from the combustion chamber to the top on either side of the central oven, passing over the top of the side ovens and down on the outside to the recuperators, from which the waste gases are taken through a flue running back of all of the benches to a chimney at the end. The height of the bottom of the ovens is the same as the lower retorts of a bench of sixes, and the total height above the floor of the installation is practically that of a standard bench of retorts.

The coal is put into the ovens through two charging holes in each oven on the top of the bench by means of a larry carried on a track on the binding bars, and running to the end of the stack of benches for its supply of coal from an elevated hopper. The coal is to be crushed before elevated to about ¼ in. The coke is to be discharged from the ovens by means of an electrically driven pusher, running on a track of the old retort house floor, into coke buggies back of the bench where it is to be quenched.

As the coal is dumped into the ovens through the two openings, some means of levelling is required and this is accomplished by a levelling rake, operated by the same motor as the pusher.

Doors on the front and back of the ovens are self-sealing, hung on hinges to be operated by hand. The gas is taken off of the oven by a branch from the front charging hole where it is conducted by a short standpipe to the same hydraulic main which was used on the old benches only reversed so that the cleaning pocket is on the front of the bench.

In the rear of the benches and above the waste gas flue, a track carries a chute to convey the coke discharged from the ovens to the quenching cars. At the side of the chute is a platform from which the operator may open and close the rear oven doors. The chute car is propelled by a hand driven worm gear.

Circulation of Heat in Bench Different from Anything Hitherto Built

As the circulation of heat in this bench is quite different from anything which has heretofore been built, a satisfactory heating is, of course, problematical.

A standard 16x18 retort contains approximately 49½ ft. of internal surface. Experience has shown in silica retorts that 400 lb of coal can be satisfactorily burned off in five hours, giving a ratio of 0.0257 sq. ft. per pound of coal carbonized in 24 hours, and these ovens, having an internal heating surface in each oven of 168 sq. ft., with a charge of 2,600 lb. of coal have the following ratios for different length charges:

For an 8-hour coking period: 0.0215 sq. ft. per lb. of coal carbonized in 24 hours.

For a 10-hour coking period: 0.0269 sq. ft. per lb. of coal carbonized.

For a 12-hour coking period: 0.0323 sq. ft. per lb. of coal carbonized.

It will be seen that for an 8-hour period, the heating surface is approximately that of a bench having known results and that for a 10 and 12-hour period, it is greater.

Should the assumption that the ability to burn off a charge is at all in proportion to the heating surface be true, there should be no reason why these evens should not fairly carbonize their charge within the contemplated period. As to the exposure of the gas to the hot zone at the top of the oven with a possible deleterious effect, the ratio of this area to the amount of gas passing through it, is much less than in the D retort and the upper part of the oven should be no hotter than the top retorts in a regular setting.

If the above results can be obtained, these benches will have a capacity of 128,700 cu. ft. per day based on the same yield as is obtained in D retorts, or, in other words, the capacity of a bench of sixes which would occupy the same floor space has been doubled. Should long charges be required, this capacity will, of course, be reduced, but even at 12-hour coking period, it would still be fifty per cent greater than the old style.

Greatest Improvement Expected in Saving of Labor

The greatest improvement expected, however, is in the saving of labor. One man should be able to operate the pusher, opening and closing the front doors. One man will be required on the top of the benches operating the charging larry and a third man on the back of the benches opening and closing doors and quenching coke.

This, with a fourth man for elevating coal and taking care of the coke, should be all of the labor required per shift for sufficient ovens to manufacture 700,000 or a million feet per day, and the work should be so arranged that only two shifts per day will be required with probably three men on the second shift, or a total of seven men against twenty-one men who are required to manufacture a less amount of gas in the present retort house.

Michigan Test Shows That Gas Coals Can be Exposed to Weather for 5-Year Period Without any Deteriorating Effect

Higher Yields of Gas Obtained When Silica Retorts Were Substituted for Clay—Temperature of Coal During First Few Months of Exposure Measured But No Spontaneous Heating Was Detected

The importance of a knowledge of the changes in gas coals exposed to the weather scarcely needs to be discussed. It may be illustrated, however, by the following hypothetical example. A gas company coking one hundred tons of coal a day desires to keep as a reserve stock one hundred days' supply or ten thousand tons. It costs this company twenty cents a ton more to take the coal from its reserve pile than to handle it directly from the cars. If this reserve must be worked over every year in order to have good coal the added cost is two thousand dollars a year. If it can be safely left for five years the added cost due to handling will be only four hundred dollars a year.

In a paper presented at the recent annual meeting of the Michigan Gas Association, Alfred H. White summarized the results of a series of tests, covering a period of 5 years, made at Ann Arbor, Mich., as follows:

Coal Exposed Freely to Effects of Climate

A carload each, of Pittsburgh and Fairmont gas coal were tested. The tests were made by the department of chemical engineering of the University of Michigan at the Gas Experiment Station, supported by the Michigan Gas Association, and were conducted with the co-operation of the United States Bureau of Mines at whose laboratories all of the chemical analyses were made.

The coal was piled seven to nine feet deep in bins with separate compartments so that the coal was not moved until the time came for its particular compartment to be tested.

The temperature of the coal in the pile was measured during the first few months and no spontaneous heating was detected. This is important because it is known that coal which has heated is inferior as a gas coal.

The coal was exposed freely to all the effects of the climate of Southern Michigan, which is on the whole, rather damp and with rather severe winters.

The main body of the coals suffered little physical change during the five years but the top six inches crumbled considerably. Chemical analyses of the coal failed to reveal any material change even in this top six inches after weathering five years. Neither was there any material change in the absolute weight of the coal. Samples of the coal immersed in running spring water showed rather more change in chemical composition than did the coals exposed to the weather.

Retort Tests Made in One of a Bench of Six Horizontals

The retort tests were made in one of the horizontal retorts of a bench of six in regular use by the Washtenaw Gas Company. This retort could, when desired, be connected to the condensing system of the adjacent experiment station.

Each coal was tested after exposure to the weather for periods of six months, one, two, three, four and five years. A charge was usually 400 lb. of coal and each charge constituted a test.

The results of thirty-three such tests of the Pittsburgh and thirty-six of the Fairmont coal are reported. Merely the averages of each period are given here, but it is probable that a more complete analysis of the results will be published later by the Bureau of Mines.

The conditions within the gas retort constitute a variable of great importance in tests of a gas coal and these retort conditions could in the main not be controlled in these tests. The retort was always in fairly good condition but had to be used at whatever temperature it happened to be and with whatever thickness of carbon happened to be on its interior surface. The averaging of the tests for a given period in part compensates for these variables.

A noteworthy systematic change occured, however, at the end of the third year when the bench was rebuilt and a sectional silica retort substituted for the clay one previously used. Higher yields of gas were obtained in the fourth and fifth years than in any of the previous years and it is most natural to lay this change to the new silica retort.

The results fluctuate somewhat from year to year, but no systematic change due to the coal can be noted.

The final conclusion is that the changes in the coal were too small to be discovered by our present methods of testing and analysis. However much this may be regretted from the scientific standpoint the practical result seems to be clearly evident:—that gas coals of this type can be exposed to the weather in a rather severe climate for five years (provided they do not heat in storage) and at the end of the five years still be entirely satisfactory gas coals.

Results of Retort Tests of Coals Weathered Five Years

Kind of Coal	Pittsburgh	Fairmont
Number of tests averaged	6	7
Products from 2,000 lbs. air-dried coal—		
Dry Coke, lbs.	1363	1306
Gas, cu. ft.	11102	10928
Tar, lbs.	169	173
Ammonia (NH^3) lbs.	4.3	4.5
Candle Power of Gas—		
London Argand	15.5	16.2
Heating Value—		
B. t. u. per cu. ft.	620	628
Candle feet per lb. coal	86.2	88.6
B. t. u. in gas per lb. coal	3446	3428

Green Towels and Sheets Used in Operating Rooms of Hospitals

The idea of using green color instead of white for the walls of operating rooms in hospitals has been extended to towels and sheets around the area of the wound to be treated. By this means light is concentrated where needed and not diffused. Black has been tried, but it has been found that this gives too much contrast. Ligatures do not stand out clearly against such a background. It is claimed that the relief to the eye by the use of green material around the wound is remarkable. Experience in this country has indicated that neutral gray is the best color for the background of the field of operation.

Introduction of Upright Lamp with Inverted Mantles Most Marked Development in Burners During Year

The rapid introduction of the upright lamp fitted with inverted mantles has been the most marked development in the line of gas light burners during the past year, according to the report of the committee on progress of the Illuminating Engineering Society. For residences this takes the form of a semi-indirect unit, fitted with three small artificial fiber mantles in limp rag form.

Outdoor lamps of high efficiency have been developed along similar lines. In these the Bunsens and entire burner head, or manifold portions, are within the globe. For porches, a new lamp is announced, which is very small and compact, and of low cost.

Returns of Boston Consolidated Show Increased Sales

The annual return of the Boston Consolidated Gas Company for the year ending June 30, has been filed with the Massachusetts Gas and Electric Light Commission, according to law, and contains some interesting facts about the year's operations. General increases in output and in sales are indicated.

Gas made during the year amounted to 3,563,317,000 cu. ft., compared with 2,957,483,000 cu. ft. in the year preceding. Gas bought of the New England Gas & Coke Company, an allied company, amounted to 2,845,000,000 cu. ft., while in the year before the amount purchased was 3,319,745,000 cu. ft.

Records of comparative sales are as follows:

	1915-16	1914-15
Cu. ft. sold by meter	5,122,214,000	5,065,077,000
Cu. ft. supplied public lamps	138,500,740	143,950,000
Cu. ft. sold to other companies	1,047,815,000	885,526,000
Cu. ft. used by company	12,677,900	11,628,200

Expenses for the years compare as follows:

For manufacture of gas:	1915-16	1914-15
Coal	$ 7,475	$ 11,305
Coke	295,568	275,281
Oil	460,925	391,820
Purifying materials	7,606	10,083
Water	6,782	5,989
Wages at works	119,710	110,770
Tools and appliances	17,671	15,695
Repairs and renewals structures and holders	6,785	6,336
Repairs and renewals machinery and retorts	47,429	73,302
Gas bought of New England Gas & Coke Co., at .289	820,974	935,865
For distribution of gas	407,577	391,880
For office expenses and management	326,687	299,269
For taxes	473,237	460,164
For miscellaneous expenses	47,822	58,665

Gas sold to other companies, and the prices were as follows:

	cu. ft.	Price	Total
Citizens' Gas Lt. Co.	151,591,000	45 cents	$68,215.95
Charlestown Gas Co.	612,000	47.5 cents	290.72
	40,000,000	30 +2%	12,240.00
Dedham & Hyde Park Gas Co.	40,226,000	47.5+2%	19,489.51
	274,900	50 cents	137.45
Everett Gas Co.	2,619,000	50 cents	1,309.50
East Boston Gas Co.	203,295,256	45 cents	91,482.87
Newton & Watertown Gas Co.	465,477,220	42.5 cents	197,827.83
	143,719,480	50 cents	71,859.74
	1,047,814,856		$462,853.57

Income from the sale of gas supplied to customers was as follows:

Supplied by Meter:	
4,688,984,862 cu. ft. @ .7997	$3,750,006.05
433,229,600 cu. ft. (schedule price)	284,854.42
Minimum charges for use of meters	22,858.98
	$4,057,719.45
For public lamps (estimated 138,500,740 cu. ft.)	91,079.28
Pumping gas to Citizens and Dedham Companies	3,180.10
Sales to other companies	462,853.57
Total income from sale of gas	4,615,442.40
From residual products (principally tar)	26,549.78
Rent of mains, profits on naphtha and holder oil sold	34,396.15
Total income	$4,676,388.33

Coke used during the year amounted to 69,990 tons, the average cost per long ton being $3.69; 12,163,831 gals. of oil were used, costing 3.79 cents per gallon.

Men employed by the company numbered 603 to 622, divided among the several departments as follows:

	April-September	October-March
At stations	174	204
Main dept.	154	116
Service dept.	55	47
Jobbing dept.	100	99
Distribution	95	93
Meter repairers	44	44
	622	603

Customers' meters are, compared with 1914-15:

	This year	Last year
In Boston	159,092	153,695
" Brookline	9,121	8,774
" Milton	1,521	1,331
	169,734	163,800

Growing Tendency on Part of Lighting—Fixture Manufacturers to Recognize Individual Requirements of Specific Locations

Fluctuations in Design Almost as Great as Those in Types of Automobiles—Indications Point to Departure from Stereotyped Ideas—Semi-Indirect Fixtures with Large Bowl Hiding All of Bunsen Parts Being Used in Increasing Numbers for Gas Lighting

The fluctuations in the design of lighting fixtures seem almost as great as those in the types of automobiles, states the report of the committee on progress of the Illuminating Engineering Society. The shower and the dome of yesterday are superseded by the totally indirect fixture of to-day and the latter may be superseded by the semi-indirect fixture of to-morrow. There is a growing tendency, however, on the part of manufacturers to recognize the individual requirements of specific locations such as stores, halls, offices, living and dining rooms, corridors, etc., and to design fixtures features which will be appropriate for each specific need.

The continued development of new sources has been followed by the design of new fixtures, but more and more there are indications of a departure from stereotyped ideas for both gas and electricity.

Developments in Gas Lighting Fixtures

In the case of gas, glassware has been developed for small units to harmonize with that used for large units when both sizes are employed in the same location. Wall-bracket, boudoir, and semi-indirect portable and table lamps have been brought out in a wide variety of finishes and materials. Semi-indirect fixtures, with a large bowl hiding all of the Bunsen parts, are being increasingly used in place of the large and massive gas fixtures with separate arms.

The portable reading lamps having a 6-ft. standard and large silk or other cloth shades have been adapted for use with gas mantles. By employing the newest type of burner and a special protecting cylinder of mica it has been found possible to confine the opening in the top of the shade to a diameter of only 5 in. No glassware is required or used.

In order to meet the varying conditions necessitated by the three types of lighting, direct, indirect and semi-indirect, convertible fixtures are available which with very little change in the parts enable the manufacturer to supply any type desired. Such fixtures which have been more or less general in electric lighting are now being made for use with gas and acetylene.

Gas Table Lamps

A modification of an idea developed some years ago in which an upturned diffusing bowl is used to hide the bulb of a table lamp, involves the use of a second and larger bowl below with arrangements for controlling separately the lamps in each bowl.

By using heat intercepting, non-conducting mica cylinders designed for ample ventilation, it has been found possible to use silk shades on gas table lamps. Mica flour is used to frost over the outer surface of the mica, thus concealing the mantle and diffusing the light.

In general there is a growing appreciation that, by the use of properly chosen cloth for shades, the lighting fixtures of a room may be made to harmonize with their surroundings.

A novel use for a table lamp is found in a combination lamp and phonograph. The base of the lamp serves to hold the disc record, turntable, electric motor, talking box, etc. The sounds produced are led up through the pedestal and released beneath the glass shade which throws them downward and outward.

Difference in Ventilation in Buildings and in Mines is in Degree of Vitiation of the Air

The difference between ventilation conditions in buildings aboveground and in coal mines is in the degree of vitiation of the air as regards low oxygen and high carbon dioxide; aboveground relatively small oxygen and carbon dioxide changes—a few tenths of 1 per cent—usually represent bad air; belowground these small percentages are insignificant. In England, the law requires that the oxygen content shall not fall below 19 per cent or the carbon dioxide content rise above 1.25 per cent in any part of the mine. Mines in this country can easily meet these requirements.

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Opportunities that are Overlooked

During the past week a surgeon who conducts a sanitarium in a southern city visited the offices of this journal. He was interested in gas only to such an extent as he could use it in his establishment, but his visit gave rise to a thought that might be applied to advantage by the gas companies in some of our smaller cities.

Many developments are being made in the line of gas using fixtures; lights, ranges, heaters, etc. It is not to be expected that the company in a town of ten thousand population will have the facilities to keep in stock, or on exhibition, a complete line of these new developments. Yet the lamp which is lacking in the local company's display might be the factor which would decide the prospective user in favor of gas as against other means of illumination.

Most well-to-do citizens of small towns, at periods, make trips to the larger centers of population. In many cases they do so for sight-seeing purposes. A curious feature of their quest is that it is not confined to one line of interest. They would be just as eager to visit the headquarters of a large gas lighting fixture company as they would to make a trip to the Statue of Liberty. The education of the public in the great advances that have been made in gas-using appliances is a paramount need of the industry to-day. Why not make use of these sight-seeng trips of citizens of small towns to the greater centers to spread this knowledge, so essential to the future prosperity of the gas industry.

Let us assume that the local gas company was in touch with this southern surgeon—as it should have been—that it knew he was interested in the cost and means of heating his sanitarium with gas, that he was of the opinion that gas is the most beneficial illuminant to the eyesight, but was very much behind the times in his knowledge of modern lighting fixtures, and that he was already using gas to a limited extent for his hot water supply.

Would it not have been to the advantage of such a gas company to have provided facilities for this surgeon to visit the large display rooms in New York City, and to discuss with experts the pros and cons of making his sanitarium an all gas establishment? This journal believes that in this particular case the local company would have secured a profitable customer by so doing, and would have gotten into the town an installation that would have provided an extremely potent advertisement in the way of attracting new business.

It believes, too, that in other cases it would be extremely advantageous. Small-town gas companies could use the display rooms in the large cities to very profitable advantage.

Should any manager of such a works desire to adopt this suggestion the AMERICAN GAS LIGHT JOURNAL will be glad to co-operate with him in every way, especially insofar as New York City is concerned. If any citizen of his town, whom he is desirous of interesting in gas, is contemplating a trip to this city, we would be very pleased indeed to have the gas company manager send him to us with a card or a note, and will guarantee that he will be given every facility to learn all the details in regard to gas in which he might be interested.

Consulting the Wishes of the Consumer in Designing Gas Lamps

In discussing an extremely ornamental lamp which his firm had lately put on the market, a representative of a prominent manufacturer intimated that the company had undertaken its manufacture somewhat reluctantly and was not over zealous in pushing its sale. The reason advanced was that the lamp was essentially ornamental, and efficiency was sacrificed to ornamentation.

It seems to this journal that this is carrying the efficiency idea to extremes. There exists a class of people to whom the extra gas consumption of such a lamp per unit of illumination means nothing. This class desires its lighting fixtures to be ornamental, and cares nothing for the regular annual charge it pays for such embellishment to the appearance of its homes or offices, and the lamp in question should assuredly appeal to this class.

Speaking not from the viewpoint of a gas journal, but from the

standpoint of a disinterested observer, the lamp in question compares in appearance most favorably, if not to even greater advantage, with any electric lighting fixture that has come to our attention. So long as its use is not harmful to the eyesight, and its efficiency is measured merely in dollars and cents, this lamp surely has a place in the lighting field.

We do not say that it should be sold under deceptive conditions. Its shortcomings should be frankly pointed out. Then, if the prospect still desires to buy, no obstacle or objection should be placed in his way.

Further, the lamp should not be denied its place in the display rooms or windows. It should, on the contrary, be given a prominent position therein.

At first sight it will attract considerable attention. If, when its lack of efficiency is explained, the customer is disinclined to make the purchase, it will at least have performed the service of getting him into a place where the recommendations of other types can be fully explained to him, and will leave on his mind a vivid impression that the company is honest in its desire to consult his interest ahead of its own.

The principle behind this manufacturer's reluctance to put the lamp forward is a commendable one, and is one of the basic laws of modern business. But in his zeal for efficiency in his own works he has overlooked the fact that the American home is the most inefficient institution in the world, and that there is no inclination on the part of the one who pays the bills to make it more efficient. It would not be to the best interest of the gas industry and manufacturers of gas lighting equipment to overlook this highly important factor. Efficiency is the pacemaker of progress, but in some cases it is well to avoid confining one's activities, to the efficiency idea to the exclusion of all else.

Management

There are two general types of managers. One of these types is always trying to save expense. The other is always trying for profits, even though the unit percentage of cost runs higher. Many an old business has almost held its own, or at least died a lingering death under a penurious system of management. No business has ever grown rapidly or become tremendously profitable under it. On the other hand the business that is managed with the idea of making profits regardless of how high the expenses may run usually prospers.

It does not pay to put on a long face and plead poverty. It does not pay to figure the cost rather than the improvement of the service. It does not pay to count the obstacles, difficulties and discouragements rather than the accomplishments.

Permanent success is the reward of the energetic, optimistic, and cheerful. The despondent, hopeless, despairing man is foredoomed to failure. As it is with individuals, so is it with the industries made up of these individuals. The management is a pretty true mirror of the rank and file. It does not pay any industry to consider economy at the expense of progress.

Means of Obtaining Trained Men

An outstanding feature of the working organization of the modern gas company is the increasing appreciation of the value of the trained man, not only for the higher offices, but for the minor posts, as well. Many companies go to great expense and devote considerable thought to the education of their employees. Others economize to an extent in this direction, and devote their money to the offering of larger salaries to obtain the men the other companies have trained.

While this journal does not believe that any concern should restrict the higher offices in its organization entirely to men who start at the bottom in its own service and work up, it does believe the first class of employers are using the most logical, and, in the long run, the most economical method.

The company which tempts a trained man from another organization is in effect spending its money blindly. It is a principle of modern business to pay a man—excepting possibly an engineer—approximately what his services are worth. It has been proved that this method pays, as a satisfied employee is as good as two dissatisfied ones of equal ability. If the man the second company seeks to add to its forces is getting only so much from the company which has trained him and whose officers are acquainted with every angle of his temperament, the likelihood is that it has some substantial reason for not paying him more. The only justification the second company can have in offering him a greater amount is on the gambling chance that the officers of the first have been mistaken in their estimate of the man's ability, which will, by no means, be found to be the general rule.

Educational work among the employees of a company pays. It gives the man a better feeling towards his employer, and it makes him better able to show his appreciation in a substantial manner. More important even than this is the fact that it is constructive work. Merely tempting a man away from a company which has already trained him, is not constructive. An organization built up on such a principle is like a masonry structure perched upon wooden stilts—it has no bottom.

Destroying the Public's Confidence in the Engineer

In taking issue with a writer in the *Engineering News,* Dr. Alexander C. Humphreys expresses as his impelling motive the fear lest the estimates of capable engineers be discredited. The journal wonders if, as he penned these words, Dr. Humphreys considered fully their tremendous import.

The confidence of the public in the engineering profession is absolutely essential to the world's progress. Each advance means the adoption of some, perhaps, untried experiment. The first great suspension bridge, the first reinforced-concrete skyscraper, the first subaqueous tunnel; all these were built on confidence in the reliability of the estimates of engineers. Millions of dollars have been invested in untried constructions, because engineers declared them practical, and the public had confidence in their statements. Destroy such confidence and progress in engineering construction ceases.

Of the existence of such confidence the gas field presents a most striking example. In almost every large city one cannot travel far without encountering a gasholder, rising high above the houses that cluster all about it. Those of the industry know that the contents of these holders, unless mixed with air in the necessary proportions, is no more explosive than an equal volume of water. But to the mind of the public it is just as dangerous and less easily guarded against than a ton of dynamite. The fact that people continue to live near such holders, and that their presence is permitted in the most congested centers, though the fears are founded on ignorance, is one of the most striking examples of the present time of the blind confidence the public has in the engineer.

To the mind of this journal the most unfortunate by-product of the valuation and rate-making epidemic this country has been indulging in during recent years, has been its effect in shattering this confidence in the engineer. Widely divergent appraisals are easily misunderstood. The average citizen in a rate-making case takes it for granted that the company under investigation will place on the stand as expert witnesses men of high reputation whose valuations can be relied upon to be considerably higher than the valuations found by the state's experts. The basic reason for this is that the company's witnesses generally have more complete data upon which to build their estimates, and sometimes because the state selects an expert whose political acumen is more pronounced than his sense of justice. But the public does not understand these factors. To it the different testimony seems biased and subsidized. It is but one step farther to consider it untruthful, and those presenting it dishonest. All this has its effect in destroying the confidence of the public in the engineer.

Dr. Humphreys' stand against the unfounded imputations concerning the particular engineers he defends is well taken and timely. It is to be hoped that in the future many others whose positions lend weight to their statements will busy themselves to the utmost to discourage this practice of recklessly and unwarrantably casting doubts upon the integrity and motives of capable engineers that has come to be almost a feature of our existence.

Inspection Campaign Effective in Developing Sales in Northern Liberties District of Philadelphia

Inspect 1388 Ranges and Make Many Adjustments—Sales Aggregate Almost $4,000—Net Profit for Campaign, $110.92

The Northern Liberties Gas Company, according to an account given by J. M. Ruegenburg, its superintendent, has found that the "service" idea pays. An inspection campaign, durating 89 working days, resulted in numerous sales, the collection of valuable information in regard to the district, the making of friends for the company and a net profit of $110.92.

Class of Population

The Northern Liberties District is that part of Philadelphia bounded by Girard Avenue on the north, Vine Street on the south, Sixth Street on the west, and the Delaware River on the east.

The houses, on the average, are two-story, some frame, others brick. The whole section is very much congested. Intersecting the main streets are many small streets, narrow courts and blind alleys.

The people are mostly foreigners, averaging, 50 per cent Jews; 20 per cent Hungarians; 20 per cent Polish, and 10 per cent native Americans.

Upon a general investigation of the homes in the territory by the commercial agent, W. J. Irvin, it was decided to start a consumers' equipment inspection.

The following plan of campaign was mapped out:

To make a thorough inspection of all appliances on the premises.

To repair, clean and adjust appliances wherever possible on the premises.

To estimate on all repairs requiring shop work.

To interest consumers in all of the company's appliances not found on the premises.

To make sales wherever possible.

To make a record for a "call-back" of all prospects which could not be closed immediately.

It was decided that the men best suited to do this work would be those who could qualify as salesmen, and also be able to handle tools and have some experience in distribution department work.

In order to gain admittance to the homes, and to show the consumers that these men were authorized inspectors, they wore the regulation cap of the distribution department and displayed prominently on their coats the official badge of the company.

A small complaint kit was given to each man. These kits contained the following: A 10-in. wrench, a pair of pliers, a screwdriver, a 6-in. rule, stove cement, white lead, bray burners and an assortment of stove bolts.

These men also carried leatheroid boxes filled with incandescent burner material. Some days the small box was used, but ordinarily the large regulation box was found more advantageous. The latter box measured 12 in. high, 10 in. wide and 24 in. long, and contained the following:

10—No. 730 Lights
2—No. 52 Junior Welsbach Lights
3—No. 71306 Lights
3—No. 71310 Lights
1—No. 630 Reflex Light
2—No. 533 White Enamel Shades
2—No. 777 Shades
1—No. 445 Angle Shade
1—No. 66 Tripod
2—No. 90 Burner Tips
2—No. 3 Bunsen Bases
2—No. 1 Mixing Chambers
2—No. 6 Pilot By-passes
2—No. 4 Pilot By-passes
2—No. 71 Burner Bases
2—No. 6 Pilot Tubes
2—No. 4 Pilot Tubes
23—Assorted Mantles
6—Assorted Cylinders
12—Magnesia Mantle Supports

The men were paid $2.75 per day, plus a commission of 2 per cent on all material sold.

Duration of Campaign

The campaign was in progress from Feb. 16 to May 31, the territory being covered in eighty-nine working days. During this time 4,599 calls were made.

The following is the result of the work:

Ranges inspected	1,388
Ranges adjusted	406
Hot Plates inspected	1,426
Hot Plates adjusted	217
Circ. Water Heaters inspected	153
Circ. Water Heaters adjusted	24
Auto. Water Heaters inspected	3
Auto. Water Heaters adjusted	1
Special Appliances inspected	76
Special Appliances adjusted	8
Upright Incan. Burners inspected	937
Upright Incan. Burners adjusted	153
Inverted Incan. Burners inspected	3,944
Inverted Incan. Burners adjusted	646
Inside Arcs inspected	388
Inside Arcs adjusted	39
Outside Arcs inspected	65
Outside Arcs adjusted	6
Flat Flame Burners inspected	15,645
Flat Flame Burners put on	1,807

Sales Indicate Degree to which Campaign was Successful

One of the essential features was "To make sales wherever possible:" The profit derived from the sale of appliances and material was desired to lower our distribution costs as much as possible.

How well this plan worked out and how successful these men were as salesmen can best be gleaned from the following sales report, totalling $3,978.88:

Ranges	114
Hot Plates	15
Circulating Water Heaters	18
Automatic Water Heaters	1
Heating Stoves	1
C. E-Z Lamps	212
Upright Lamps	21
Inverted Lamps	107
Arc Lamps	76
Fixtures	31
Brackets	56
By-passes	10
⅜-in. Ind. Hose Cocks	66
Iwantu Gas Irons	65
Round File Igniters	1
Tubing (6 ft. pieces)	6
Junior Lamps	24
Sad Iron Heaters	8
Barbers' Boilers	1
Toasters	2
Rutz Lighters	11
Tailors' Irons	1
Meter Applications taken	50
Services	15
I. B. M. Contracts taken	62
I. B. R. Material sold	$49.13
Gas Appliance repairs	$16.00

Net Profit of Campaign

Deducting labor charges to "New Business," commissions paid to salesmen, cost of material sold, store room charges, installations costs, labor charges to "Consumers' Premises Expense," and the cost of Bray burners, the campaign showed a net profit of $110.92.

The greatest satisfaction in conducting such a campaign is the assurance that the company now has, that a vast majority of its consumers are securing perfect satisfaction in the use of their gas appliances.

It is gratifying, too, to know of actual conditions in the territory and that it has an up-to-date record of the appliances to be found on consumers' premises.

The success of the inspection, it is asserted, was primarily due to the employment of men qualified as salesmen, and with a salesman's knowledge of how best to approach the consumer and to give the idea of a service to be performed. The record of sales in itself is proof of the cordial frame of mind of the consumers and of the confidence inspired by the company's men.

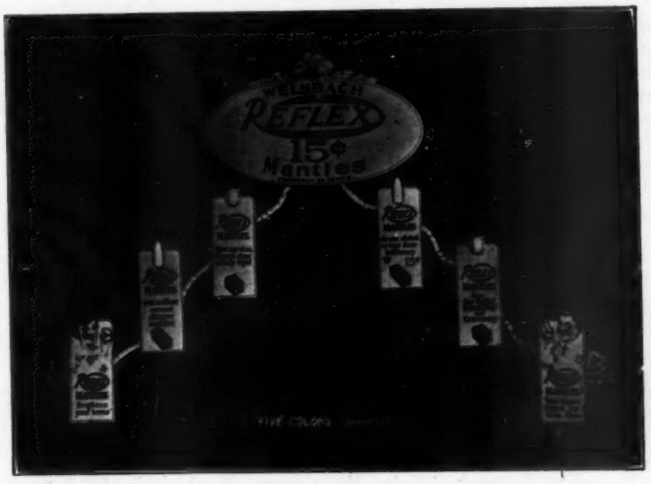
THESE TRANSPARENCIE MEASURE 13 BY 50 INCHES

LONG, SLENDER POSTERS ARE PRINTED ON BOTH SIDES AND COLORS SHOW OUT BRIGHT AND CLEAR

Welsbach Company's Clown Presents New Features in Gas Lighting Display Design

Though Ingenious in Make-Up is Easy to Assemble—Goes to Companies in Box Containing Other Decorative Features for Window Displays During Gas Lighting Week

GAS LIGHTING WEEK ANNOUNCEMENT IN THREE COLORS



EXPLICIT DIRECTIONS ARE GIVEN FOR MAKING UP WINDOW DISPLAYS

One of the contributions of the Welsbach Company to the success of Gas Lighting Week, Oct. 9 to 14, is a window display outfit consisting of an expensively gotten-up clown and various translucent posters, all in bright colors and very attractive appearance, which goes express prepaid and free of expense to those companies or dealers whose sales justify it.

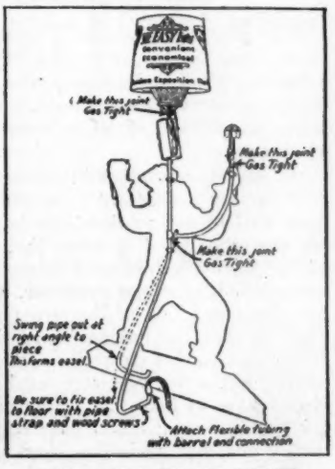
The clown is printed in five colors, is made of extra heavy cardboard, and measures 60 in. high by 40 in. wide. On his nose is placed a box of C E-Z mantles and an upright mantle with glazed glass globe. In one hand he holds a torch of four inverted burners and in the other a box of mantles. The piping at his back is an especially ingenious feature, and is so placed that, when the figure is in position, no sign of the gas pipe is shown at any point. The accompanying diagrams are reproductions of the direction cards the company is sending out for the purpose of instructing the companies as to the assembling of the figures.

The revolving shade above the upright mantle is made of translucent material printed on both sides so that the colors show through bright and distinct. A metal fan at the top is kept in motion around the vertical diameter by the heat of the lamp.

The accompanying photographs show the completeness of the directions which the company is sending out for the placing of

Directions in box for assembling revolving sign
Put complete light with shade here.
Put bar in place
Paste Mantle card in place
Leave no pipe showing between hand and light, nor between face and revolving shade

NO PIPING SHOWS ON FRONT OF ASSEMBLED FIGURE


Make this joint Gas Tight
Make this joint Gas Tight
Make this joint Gas Tight
Swing pipe out at right angle to place this forms easel
Be sure to fix easel to floor with pipe strap and wood screws
Attach Flexible tubing with barrel end connection

BACK VIEW SHOWS PIPING ARRANGEMENT

BRIGHT COLORED CLOWN WITH REVOLVING LAMP SHADE MAKES ATTRACTIVE DISPLAY

WINDOW DISPLAY IN EIGHT COLORS

the posters in window displays, and give details as to the number of colors in each. The long slender announcements are three-colored transparencies, 13 in. wide by 59 in. long, and likewise printed on both sides.

Comparison of Atmospheric Air With Mine Air

When atmospheric air enters a coal mine, it changes in composition according to the velocity with which it traverses the workings, the amount of coal with which it comes in contact—that is, the extent of the mine workings that it traverses, the gaseous nature of the seam, the tendency of the coal to absorb oxygen and the temperature and wetness of the mine, state G. A. Burrel, I. W. Robertson and C. G. Oberfell in a paper on black damp in mines, prepared for the U. S. Bureau of Mines.

As regards the details mentioned, the governing conditions are as follows: Other things being equal, more carbon dioxide and methane are present and there is a greater deficiency of oxygen at places where the air is still, as at working faces and in old workings. The purity of the air depends on the distance it has traveled, so that in a well-ventilated mine the air is purer at working faces near the shaft than at those that are remote. In the same mine the air will be fresher and purer when the mine is ventilated by a split system than when the air traverses each working face and entry. Some mines vary greatly as regards the generation of methane. Methane is not only dangerously inflammable, but, if introduced in large proportions at some parts of a mine, it lowers the oxygen content of the atmosphere to such an extent that the atmosphere will not support the combustion of lamps or even will not support life.

Coals differ as regards their power of absorbing oxygen. Absorption of oxygen is never accompanied by a molecular proportional increase in the amount of carbon dioxide produced, for the oxygen combines with certain unsaturated hydrocarbon compounds in the coal.

The amount of water vapor in air is principally a function of the temperature of the air; hence, if air that is comparatively dry enters a mine, if the temperature of the mine is higher than the outside temperature, and if the mine is comparatively wet, then the proportion of water vapor taken up by the mine air may be greatly in excess of that in the atmospheric air.

In mines other than coal mines the chief factors that decrease the oxygen content of the mine air are the velocity of the air current, the extent of the workings traversed by the air, the amount of oxygen taken from the air, and the amount of carbon dioxide or other suffocating gases added to it by the decay of mine timbers, the burning of lights, the breath of men and of animals, and the oxidation of minerals, and also by the gases given off from the rocks penetrated.

Value of Tar Ammonia and Benzol Products in Gas Making Totalled $25,000,000 in 1915

237,400,000 Gal. of Tar Obtained, Approximately 198,000 Tons of Ammonium Sulphate and Over 16,600,857 Gal. of Benzol Products

The value of tar, ammonia, and benzol products recovered in the manufacture of artificial gas in municipal plants and at by-product coke ovens in the United States in 1915 was nearly $25,000,000.

Statistics recently compiled by C. E. Lesher, of the United States Geological Survey, show that more than 51,340,000 gal. of tar was obtained in connection with the manufacture of oil and water gas, that nearly 48,000,000 gal. of tar was recovered at coal-gas plants, 138,400,000 gal. of tar was obtained in connection with the manufacture of by-product coke, and that the total quantity of tar produced in the United States in 1915 was more than 237,400,000 gal., valued at $6,260,000.

The oil and water gas tar had an average value of 2.2 cents a gallon, the coal-gas tar a value of 2.03 cents a gallon and the by-product tar a value of 2.6 cents a gallon.

Coal Gas Plants Negligible as Source of Supply of Benzol Products

Approximately 50,700 tons of ammonium sulphate were obtained from the coal-gas plants and about 197,000 tons from by-product coke plants, a total of about 198,000 tons. The value of this ammonia was more than $11,175,000.

The coal-gas plants produced and sold 336,213 gal. of benzol, drip oil, and holder oil, valued at $28,281, an average value of 8.4 cents a gallon. Benzol products recovered in connection with the manufacture of by-product coke amounted to 16,600,857 gal., valued at $7,337,371, an average of 44.2 cents a gallon.

It is thus seen that coal-gas plants are negligible as a source of supply of benzol products.

Nearly 223,000 lb. of naphthalene, valued at $3,565, was obtained and sold from the coal-gas plants as compared with 465,865 lb., valued at $46,959, from the by-product plants.

More Than 27,000 Tons of Retort Carbon Obtained

More than 27,000 tons of retort carbon, valued at $183,170, an average of $6.73 a ton, was obtained from the oil and water gas plants, and 1,696,366 tons of gas coke, valued at $7,222,744, or an average of $4.25 a ton, was obtained and sold from the coal-gas plants in 1915.

Including by-product coke, the output of which in 1915 was 14,072,895 tons, valued at $48,558,325, the coke and retort carbon produced in the United States was 15,796,461 tons, valued at $55,964,239.

The value of the tar, ammonia, benzol products, naphthalene, and coke produced in the United States in 1915 was $80,816,975.

Creeping in of Politics Greatest Disadvantage of State Regulation of Public Utilities

The greatest disadvantage of State regulation of public utilities is the creeping in of politics, stated Samuel Insull in a recent address. That is the poison which will ruin any regulating body, and it is our duty as citizens, just as much as our duty as operators of utilities, to decry commissions being used for political purposes.

Of course, regulation interferes with our liberty of action, and that is very unpleasant to a man of positive character who has been used in the public-utility business to do about as he pleased. On the other hand, I think that is a very good discipline. One of the great disadvantages, to my mind, of trouble, the world over—whether it is on the street car, or whether it is on the interurban car, the trunk line of the steam railroad, or in ocean transportation—is that the human being, when he is working for a little larger corporation or business than the average man in the community works for, gets very much "sot up." I often think myself that I have to take that criticism to myself, and I will not only ask you to pass it on to your subordinates, but keep it for yourselves, and ask yourselves how much you get "sot up" in your particular communities because you think you are operating a relatively large business in your community.

News of the Gas Industry

Ohio Utilities Commission Rules Against Including the Franchise Value in Gas Company Valuation

In setting down the valuation of the Union Gas & Electric Company's Cincinnati electrical properties, the State Public Utilities Commission of Ohio did not include any item covering the value of the franchise held by the company.

"We consider that the value of the right or franchise of the company to own or enjoy the same after it is obtained should not be taken into consideration and valued as a part of the company's property," stated the commission. "If the company actually paid to the city as a consideration for the grant of a franchise a certain sum of money, this would be given consideration, but there is no claim or evidence showing any such payment.

The commission therefore rejects the claim of the company for a franchise value of $5,581,600.

St. Petersburg, Fla., May Sell Gas Plant

Definite figures, showing the amount the company is willing to pay for the St. Petersburg gas plant have been asked of the J. B. McCrary Company, by the special committee from the city commissioners, appointed to negotiate for the sale of the plant. The offer for the plant, as made by the McCrary Company, is regarded as too vague to be even considered. The hitch is over what is meant by "original construction cost," the company having offered to pay $25,000 bonus over and above the construction cost. It is now believed that there will be several bidders.

The city will adopt a plan for installing meters for gas that will insure a profit to the plant for gas sold.

Johnstown's Mayor Files Complaint Against New Gas Rate

A complaint was filed with the public service commission of Harrisburg, Pa., this morning by Louis Franke, mayor of Johnstown, against the Johnstown Fuel Supply Company alleging an unjustifiable increase of rates by the company for supplying gas to industrial and individual consumers and the tentative violation of contract.

Will Fight New Gas Rate at Richmond, Ind.

City officials of Richmond, Ind., are planning action to resist the new order of the public service commission to increase the rate for natural gas in Richmond to 70c. per thousand cubic feet. Either a direct appeal to the courts from the findings of the commission will be made, or a petition to enjoin the Richmond company from carrying out the new rate schedule will be filed in court.

Fire Destroys Port Arthur Gas & Power Company Building

A fire originating in the warehouse of the Port Arthur Gas & Power Company, yesterday, totally destroyed the building. It is thought that the fire was of incendiary origin, and the gas company officials will thoroughly investigate.

The city water lines did not reach as far out as the scene of the fire and but feeble attempt was made to quell the flames.

Amherst Gas Company Opens New Recreation Rooms for Employees

The Amherst Gas Company has leased the basement of the new Parisau block on Amity street for a period of five years. It is the intention of the company to open the rooms as a clubroom for its employees. The apartments will consist of a reading, pool, card and toilet rooms and will also be equipped with the stereopticon lantern for lecture work as it is planned to assist the employees from an educational standpoint. Another purpose is that the employees will have a place to congregate and will be more readily found in case of emergency.

Best Attendance for Years Registered at First Day's Session of Michigan Gas Association Convention

Report of Committee to Affiliate with American Gas Institute Accepted and Dues of Association Raised to $5.00 to Include Institute Membership—Feature of Having Manufacturers' Representatives on Program a Taking One

The best attendance for a number of years was registered at the first day's session of the Michigan Gas Association at Detroit, September 21-22.

The secretary's report showed a gain in membership, and the report of the committee to affiliate with the American Gas Institute was accepted. Dues of the Association were raised to $5.00 to include the Institute membership.

The discussion following the presentation of the papers was so lively that Thursday's business was not completed on the day scheduled.

The feature of having manufacturers' representatives on the program proved a taking one.

The steamer "Pleasure" was chartered by the association for an outing on Thursday afternoon. All assembled at the convention took the trip, and deck sports, amusements and dancing were indulged in.

Barberton, Ohio, Gas Company Asks for New Franchise

The East Ohio Gas Company has petitioned the City Council of Barberton, for a new franchise for one year. The old franchise expired in August, and since then the company has been operating without a formal contract. The reason given for not asking for a longer franchise is that the company wants to harmonize its activities with the growth of the city.

Abnormal Demand for Labor Reflected in Decrease in Enrollment at Industrial School

The abnormal demand for labor, brought about by the prosperous condition of business at the present time, has resulted in a decrease in the enrollment of students at the New Bedford Industrial school. Up to date 113 boys and girls have enrolled for this year's work, compared with 189 on the same date last year.

A typical illustration of the conditions which have brought about the decrease is found at the new power plant of the New Bedford Gas & Edison Light Company, which is being built by the Stone and Webster Engineering corporation. On that one piece of work alone ten undergraduates and two graduates of the school are employed, the former receiving an average wage of $13.50 per week and the latter $16.20.

Gas Company Offers Safety First Instruction to Children

The Wisconsin Gas & Electric Company is trying to introduce safety first instruction to the school children of Kenosha.

To this end the company will, in the near future, distribute a "Primer of Precaution."

This is not an advertsing proposition, and its sole object is to inculcate into the minds of the Kenosha children habits of safety, and to give them some idea of the perils of the open roadway.

The company will also print the pages of the booklet in big advertisements, carried in local newspapers.

Interesting pictures are included in the work such as will appeal to children. It is not filled with statistics of lives lost, or children injured, but it shows just why children are injured and by showing this, warns the children away from impending danger.

Boston's Mayor and Engineer Favor Gas For High Pressure Fire Service Pumping Station

Gas Plant Advantages—No Fixed Charges—The Location of Station at North End Would Lend Itself Better to Gas Plant than Electric —The Difference in Speed is Not Serious, as Either the Gas or Electric Unit Could Easily Anticipate the Demand for Water

A modification of the plans for Boston's high pressure fire service system is being advocated by Mayor Curley, as the result of the report on existing conditions submitted to him by Engineer Joseph Rourke, the efficiency expert he has placed in charge of the work.

The new plans will save an initial outlay of $250,000, and would effect a saving of at least $20,000 annually. The use of a gas power pumping plant is advocated instead of an electric plant, and 11½ miles of high pressure pipes and hydrants may be made available instead of only the 6½ miles under the present appropriation.

The following comment in regard to the proposed gas power plant has been abstracted from the report of Engineer Rourke:

"In regard to the electric power for the high pressure station, our negotiations have not been entirely satisfactory, and it means that there would be considerable yearly fixed charges, which would be entirely eliminated were a gas engine centrifugal pumping plant adopted. If the location at the North End were decided upon it would lend itself better to a gas plant than an electric plant.

"The gas plant has no fixed charges. There is always a reserve of gas in storage, and the only question arises in regard to the speed with which a unit could be put in commission. The electric unit is quicker, but the small difference in time in this connection is not serious, as either the gas or electric unit could easily anticipate the demand for water, because they are started into service upon receipt of the alarm from the high pressure district.

"With the large station and with the $1,000,000 appropriated for this purpose, we would have only 6½ miles (the present system), and only one feeder into it from the pumping station at the Basin location."

Sour, Disagreeable Employee a Dangerous Liability

"A sour, disagreeable employee is recognized by utility companies as a dangerous liability," states William H. Hodge, publicity manager of H. M. Byllesby & Company, in a recent magazine article.

"Many things have taken place in the management of utility companies during the past few years to make them more popular with the public. Public relations have been studied by operators in a thorough going way. A conscientious effort has been made to inform the public as to policies and practices. Transactions with customers have become more visibly consistent with genuine ideals of efficient and economical service.

"A modern utility organization causes citizens to feel that it is a vital, progressive part of the community—that its officers and employees are of them and with them all the time. Those connected with the company do not shirk civic and social duties. They occupy the positions in associations, clubs, churches, lodges, etc., for which their abilities fit them.

"Every man on the payroll is expected to be a citizen first and a public utility man afterward. A sour, disagreeable employee, is recognized as a dangerous liability. Next to him in point of unsuitability is the man who has lost interest in his work and faith in his employer.

"All of this and similar efforts by utility companies have been along lines which might be termed the 'democrazation' of the utilities. The next step is logically toward a wider distribution of ownership of the service corporations among the people. Stockholders' lists show each year a larger and larger number of individuals. Some of the great corporations will soon have more financial partners than they have employees, and many of them are encouraging their workmen to become joint owners."

Indiana Public Service Commission Approves Various Important Rate Schedules

The Public Service Commission of Indiana, in a group of orders just issued, has approved several important schedules of gas rates throughout Indiana's cities and towns.

The commission has approved a new schedule of artificial gas rates for Seymour, furnished by the Interstate Public Service Company, which represents a decrease in the rates formerly given to large consumers of the product. The new schedule is as follows:

For the first 5,000 cu. ft.	$1.10
For the next 5,000 cu. ft.	1.00
For the next 15,000 cu. ft.	0.90
For the next 25,000 cu. ft.	0.80
For the next 25,000 cu. ft.	0.70
All over 75,000 cu. ft.	0.60

A discount of 10 cents a thousand cubic feet is allowed if bill is paid promptly, and a minimum charge of 50 cents a month for meter is permitted.

The rates at Seymour became effective as of Sept. 1.

The commission has entered an order, approving a new schedule of rates for the city of Peru, which is a decrease over the rates now charged there, according to the state body. The Peru Gas Company had asked that the new schedule be approved. The rates are as follows:

First 10,000 cu. ft.	$1.00
Next 20,000 cu. ft.	0.90
Next 20,000 cu. ft.	0.80
All over 50,000 cu. ft.	0.70

The existing rates for gas in Peru were $1, regardless of the amount consumed. The new rates are to be effective Oct. 1.

The commission has authorized the Vernon Natural Gas & Oil Company, of Fortville, to install a new system of rates for natural gas. Formerly the company has charged 35 cents a thousand cubic feet, regardless of the amount consumed, with a discount of 5 cents a thousand feet. The new rates, which are aimed to encourage the use of natural gas by large consumers, provide for a rate of 30 cents a thousand feet for all gas in excess of 25,000 cu. ft., with a discount of 5 cents for prompt payment and a rate of 25 cents a thousand cubic feet, where 50,000 cu. ft. or more are used in one month, with a 5 cent discount per thousand feet for prompt payment.

The Batesville Gas Company, of Batesville, Ind., has surrendered its franchise to the commission, and accepted an indeterminate permit under the Indiana utility law.

Worcester, Mass., Company Reports Largest Business Year

The annual report of the Directors of the Worcester, (Mass.) Gas Light Company indicates the largest output for any year in the company's history of 65 years. Gas sold in 1915-16 amounted to 968,171,000 cu. ft., which is 8.1 per cent more than in any previous year. President D. D. Barnum announced that the new retorts in the coal gas plant would be operated the last of this month, giving the plant twice its former capacity.

August Coal and Coke Shipments Exceed Those of July

The following is a statement of car loads of bituminous coal and beehive coke that originated on 50 railroads in August, 1916, compiled from reports received by the Geological Survey, Department of the Interior, by noon, September 15, 1916.

	August, 1916	July, 1916	August, 1915
Carloads of bituminous coal	451,611	400,716	409,043
Carloads of beehive coke...	51,656	47,354	47,190

August, 1916, showed an increase in shipments of bituminous coal of 10 per cent over August, 1915, and of 13 per cent over July, 1916. The corresponding increases in beehive coke shipments were 9.5 per cent and 9 per cent.

Rapid Development of Industrial Fuel Business is Taxing Doherty Company's Present Force

Likely that Additional Specialists will be Added in Near Future—Coke Pile at Knoxville, Tenn., Becoming a Problem

The importance and rapid development of industrial fuel in the Doherty Organization has now attained such proportions that the present force is unable to cope with the various problems which arise, and it is quite likely that additions to the force of industrial fuel specialists will shortly be made.

In every property where an industrial fuel campaign has been introduced, success has been attained, according to Henry O. Loebell, head of the industrial fuel department. At Knoxville, Tenn., for instance, the gas output has become such that the coke pile is worrying the Company as how to get rid of it.

After nearly half a year's work on one prospect in Lebanon, Pa., this customer has been secured through the industrial duel department's perfecting an appliance that fitted the needs of his customer, and the gas output of the company has been practically doubled.

In the natural gas properties the industrial fuel department has succeeded in securing business for the entire capacity of the pipe lines, and should any industry in the field give up the service, there are many other industries in prospect to always keep up with the natural gas supply.

"This success has been due to intelligent experiments on various appliances," states Mr. Loebell. "Before the department approves any appliance for use for industrial fuel in the properties, it is thoroughly tested, and if faulty in any way is rejected."

Another notable example of industrial fuel progress is found at the Overland Automobile factory at Toledo, Ohio, which has developed so there that isolated gas mains had to be run to the shops to keep up with the demands.

West Fairview, Pa., May Install Gas Street Lights in Preference to Electric

The City Council of West Fairview is reported to be planning to substitute gas for electricity for street lighting purposes. The Harrisburg (Pa.) Gas Company, which is installing pipes for gas throughout the town, has made an offer to the council which it is likely to accept.

Sues Gas Company on Allegation That Lack of Heat Caused Child's Death

Alleging that his child's death was due to the gas supply being cut off, J. A. Robertson of Ardmore, Okla., has brought suit for damages against the Dundee Petroleum Company. His petition states that the gas was cut off on Nov. 31, 1915, and remained off for 24 hours. During the period a child was born in his home. The plaintiff charges that lack of heat caused the infant's death.

Natural Gas to be Turned on at Belleville and Collinsville, Ill.

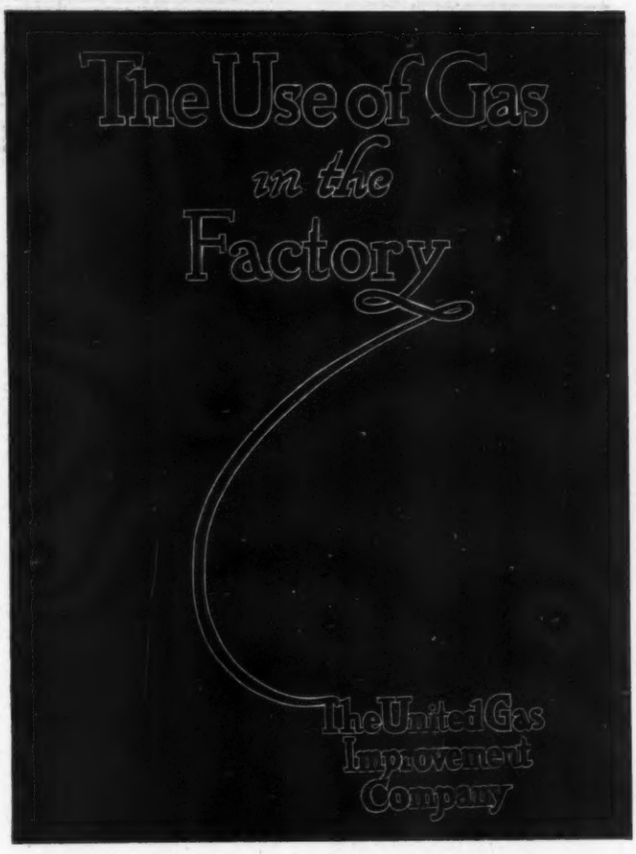
Natural Gas from the Staunton field has been turned into the mains of Belleville and Collinsville, Ill., by the St. Clair County Gas & Electric Company.

Gas Turned On At Lenox, Mass.

The citizens of Lenox are now obtaining gas from the Pittsfield Coal Gas Company of Pittsfield, Mass. Practically all of the main streets of the town have been piped.

Want Lower Gas Rates at Independence, Kans.

The citizens of Independence want lower gas rates. The present rate is $1.25 with a discount, making it $1.15. The gas company claims that with the present franchise, which calls for $1 gas after Aug. 16, it is losing money.



ATTENTION OF ILLUMINATING ENGINEERS WAS DIVIDED BETWEEN THIS BOOKLET AND ADDRESS OF CHARLES P. STEINMETZ

U. G. I. Makes Certain That Illuminating Engineers Do Not Overlook Value of Gas for Industrial Purposes

When the members and guests at the Illuminating Engineering Society assembled for the first day's session of the annual meeting at Philadelphia last week, each found on his chair a neat booklet entitled "The Use of Gas in the Factory." Its appearance was so inviting that many could not resist the temptation to turn over its pages during the early proceedings; even the extremely interesting address of Charles P. Steinmetz had to share the interest with this effort of the United Gas Improvement Company to present the uses of gas other than for lighting clearly before the minds of the visitors.

On the first facing page the company asserted that:

"There are more than a thousand uses to which gas can be economically applied in manufacturing processes. There are many gas appliances on the market for doing various kinds of work. We offer in this booklet suggestions and descriptions of appliances to do heat treatment work in factories.

"Don't ask, 'How much gas does this appliance burn?' Net results are what count. Analyze the last cost of your material—the cost per pound or per piece of finished product. Your saving in time and labor is the important item. *It is not the cost of fuel that counts. It is what that fuel can do that no other fuel can do as well.* Gas practically applied has no competitor for economy, speed and convenience."

It then went on to describe, among other appliances, a gas forge, an oven furnace, a case hardening furnace, a high speed steel furnace, an oil tempering furnace, a muffle furnace, cyanide furnace, soft metal furnaces, a lead hardening furnace, a tinning furnace, a crucible furnace, glue heaters, a cauldron furnace, a vat dryer, confectioners' furnaces, and a gas heated steam boiler.

Many favorable comments were heard in regard to the effort. Those versed in such matters were agreed that the work was a splendid example of intelligent publicity. It was not so much the matter that the book was so distributed that won commendation for it, but the fact that the presentation of the matter was so effective as to actually command attention.

Societies and Associations

THE AMERICAN GAS INSTITUTE has prepared the following tentative program of papers and committee reports for its annual meeting, to be held in Chicago, Oct. 17 to 20:

TUESDAY, OCT. 17.

MEASURING FLOW OF GASES FROM INDIVIDUAL GENERATOR SETS. BY J. M. SPITZGLASS.

REPORT OF COMMITTEE ON CLASSIFICATION OF GAS ENGINEERING. BY H. W. PECK, chairman.

REPORT OF COMMITTEE ON MISLEADING STATEMENTS. BY A. E. FORSTALL, chairman.

REPORT OF COMMITTEE ON NOMENCLATURE. BY R. B. HARPER, chairman.

REPORT OF COMMITTEE ON CARBONIZATION. BY C. W. HUNTER, chairman.

HOW ONE GAS COMPANY HANDLES ITS COKE BUSINESS. BY F. W. SEYMOUR.

REPORT OF COMMITTEE ON REFRACTORY MATERIALS. BY J. W. BATTEN, chairman.

REPORT OF COMMITTEE ON STANDARD TESTS. BY J. F. WING, chairman.

OILS FOR WATER GAS. BY F. L. WEISSER.

DEBENZOLIZING WATER GAS.

BY-PRODUCT COKE PLANT.

THE BULLETIN SYSTEM AS A MEANS OF INSTRUCTING EMPLOYEES. BY C. S. RITTER.

MERIT SYSTEM. BY W. D. KELLEY.

ORGANIZING FOR COST REDUCTION IN THE CONSUMERS' BOOKKEEPING DEPARTMENT. BY F. H. PATTERSON.

WEDNESDAY, OCT. 18.

GAS VERSUS ELECTRIC COOKING. BY S. C. BRATTON AND G. D. MANTLE.

REPORT OF COMMITTEE ON DISTRIBUTION. BY J. D. VON MAUR, chairman.

REPORT OF COMMITTEE ON DISTRIBUTION STANDARDS. BY W. C. MORRIS, chairman.

REPORT OF COMMITTEE ON INTERNATIONAL UNIFORM SYSTEM OF PIPE THREADS. BY W. C. MORRIS, chairman.

REPORT OF COMMITTEE ON SUPPLYING LARGE BUILDINGS WITH GAS. BY O. H. FOGG, chairman.

INDUSTRIAL GAS APPLIANCES. BY S. TULLY WILLSON.

REPORT OF COMMITTEE ON CONSUMERS' METERS. BY W. K. HARRINGTON, chairman.

COST RECORDS ON APPLIANCE INSTALLATIONS. BY H. B. LOHMEYER.

OUTLINE OF CREDIT SYSTEM IN OPERATION, BY PEOPLES GAS LIGHT & COKE COMPANY. BY ROBERT BLAIR.

THURSDAY, OCT. 19.

MANUFACTURED GAS FOR HOUSE HEATING. BY G. S. BARROWS AND C. C. WINTERSTEIN.

REPORT OF COMMITTEE ON UTILIZATION OF GAS FUEL APPLIANCES. BY W. J. SERRILL, chairman.

REPORT OF COMMITTEE ON GAS HOUSEPIPING. BY G. I. VINCENT, chairman.

REPORT OF COMMITTEE ON PIPE JOINTS. BY G. I. VINCENT.

UNIT COSTS IN DISTRIBUTION WORK. BY A. A. TREADWAY, chairman.

OXY-ACETYLENE WELDING IN DISTRIBUTION WORK. BY CHARLES WILDE.

REPORT OF COMMITTEE ON CHEMICAL TESTS. BY C. C. TUTWILER, chairman.

EQUIVALENT OF THE OBSERVED HEAT VALUE OF THE LIGHT OILS SCRUBBED FROM COKE OVEN GASES. BY J. W. SHAEFFER.

THE REMOVAL OF SULPHUR FROM SPENT OXIDE. BY E. J. MURPHY.

PURIFICATION OF WATER FOR GAS-MAKING PURPOSES. BY W. H. FULWEILER.

SOME CHARACTERISTICS OF GAS OILS. BY E. C. DOWNING.

GAS IGNITION. BY T. J. LITTLE, JR.

CHICAGO'S EXPERIENCE WITH A SEPARATE LIGHTING DIVISION. BY C. A. LUTHER.

FRIDAY, OCT. 20.

REPORT OF COMMITTEE ON GAS LIGHTING. BY C. O. BOND, chairman.

STREET LIGHTING.

Personal Notes

C. L. BURGER has taken over the management of the Southwestern Gas Company of Brenham, Tex.

C. D. BARTLETT, of Bartlett & Company, 1938 Walnut Street, Philadelphia, Pa., is in Toronto, Canada, attending the meeting of the directors of the National Commercial Gas Association.

JOHNSON & MERRILL, gas engineers of Toledo, Ohio, have been retained to make a survey of the gas situation at Bellefontaine, Ohio. They are to prepare figures on the cost of erecting a new gas plant on the present site and also on a new site, on the cost of manufacture of coal and water gas, and the advantages of each proposition.

ALFRED F. TOWNSEND, retiring general manager of the Woonsocket division of the Blackstone Valley Gas & Electric Company, was tendered a farewell reception and banquet, Sept. 15, by the employees club of the company. More than 120 persons attended the banquet.

WALTER J. BALAAM, prominent Exeter business man, for years a partner in the firm of E. S. Balaam & Company, but lately in charge of the Exeter office of the Mt. Whitney Power & Electric Company, has purchased a controlling interest in the gas and electric business of Long Beach. He will leave Exeter for the southern city next Friday to take active charge of the new business.

DR. WILLIAM L. MILLEA has been appointed medical examiner for the Consolidated Gas, Electric Light & Power Company of Baltimore, Md.

Construction Notes

LENOX, MASS.—The Pittsfield Coal Gas Company has been granted permission to open streets for the purpose of laying mains and for repairs.

LAWRENCE, MASS.—The Lawrence Gas Company has been granted permission to extend its gas mains on Phillips Street near Cambridge Street.

NORTH ANDOVER, MASS.—The selectmen have granted permission to the Lawrence Gas Co. to lay a gas main in Third street.

WILLIAMSTOWN, MASS.—The Williamstown Gas Company has put in a petition to open Latham and Meachman Streets for the purpose of laying a new gas main. The present main is so small that it is inadequate for the needs of the community.

MANSFIELD, OHIO—The Logan Natural Gas & Fuel Company is erecting a $20,000 plant to make gasoline from waste gas at its pumping station.

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 20 cents.

1,196,828: METHOD OF AND APPARATUS FOR DETECTING AND MEASURING LEAKAGE IN PIPE-LINES. Christopher Weatherson, Chicago, Ill.

1,196,973: BAFFLE FOR GAS-HEATERS. Truman G. Palmer, Chicago, Ill.

1,197,054: GAS-REGULATOR. Ernest G. Ofeldt, Nyack, N. Y.

1,197,365: LIMP INCANDESCENT MANTLE. Sverre Gulbrandsen, Woodbury, N. J., assignor to Welsbach Light Co., Gloucester City, N. J.

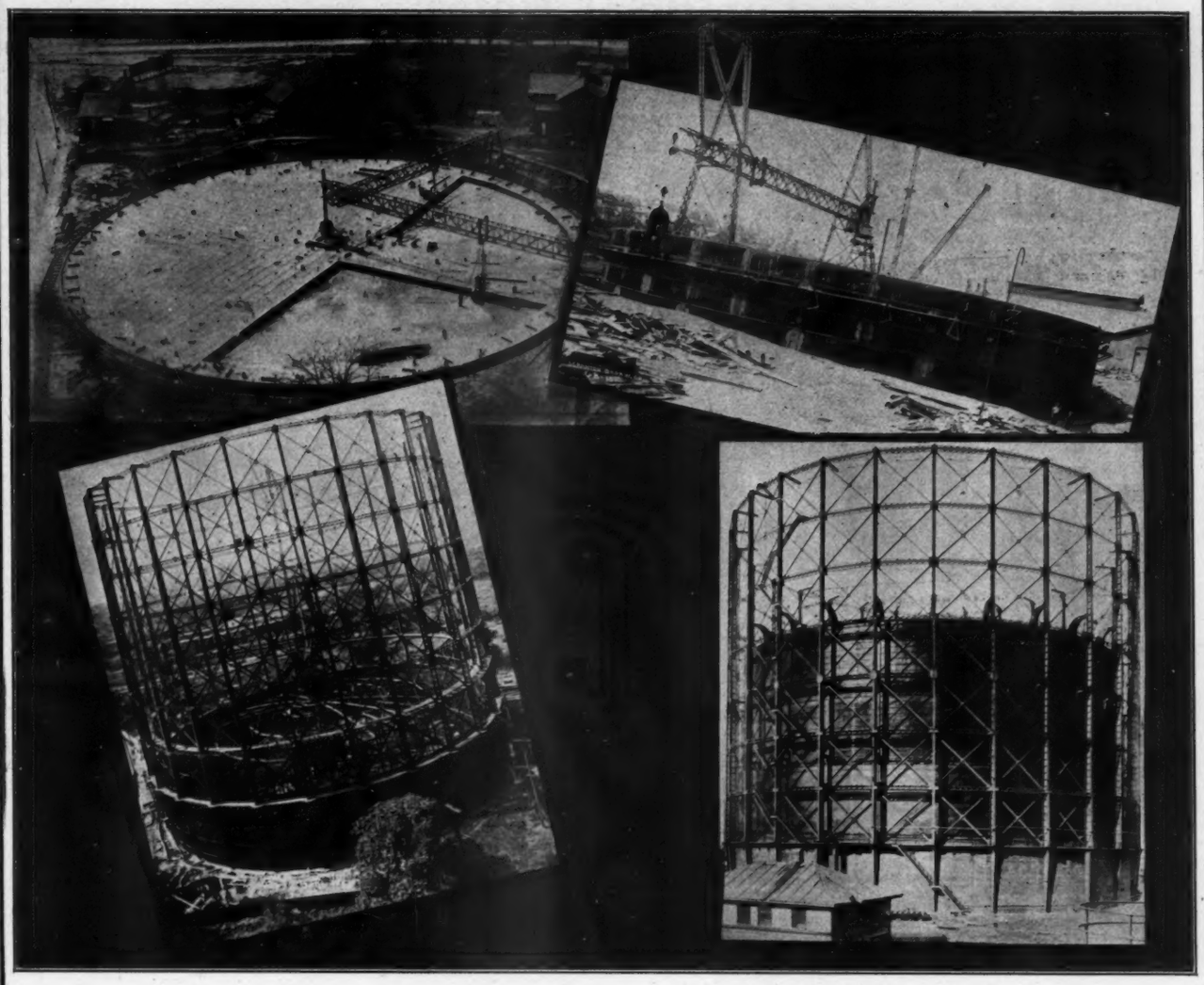
1,197,625: GAS-PRODUCER. James A. Herrick, Newark, N. J.

1,198,010: GAS-PRODUCER. George B. Cramp, Duluth, Minn, assignor to Morgan Construction Co., Worcester, Mass.

1,198,037: GAS-PRODUCER. Ebenezer A. W. Jefferies, Worcester, Mass., assignor to Morgan Construction Co., same place.

1,198,165: COMBINATION GAS BURNER AND HEATER. Everett W. Stewart, New York, N. Y.

1,198,192: GAS-METER. Marshall Cornine, Mount Vernon, N. Y.



RITER-CONLEY COMPANY

STEEL CONSTRUCTION

PITTSBURGH

HELME & McILHENNY

1339-1349 Cherry St., Philadelphia, Pa.

ESTAB. 1848 H & McI High Grade Meters

GAS METERS

HINMAN DRUM STATION METERS, FOULIS GAS GOVERNORS
PREPAYMENT METERS

REPAIRING AND CONVERTING

PROMPT SHIPMENTS - - - - - CORRESPONDENCE SOLICITED

Financial Notes.

THE KINGS COUNTY LIGHTING COMPANY received permission from the Public Service Commission to issue $675,000 5 per cent bonds, payable July 1, 1954, on condition that $134,545 be credited to the depreciation fund. Application was first made on May 25, and an order was issued authorizing an issue of $472,000, the Commission holding that the difference between this amount and that asked for, less discount, represented moneys which should have been credited to the depreciation fund. The new order, issued, after a rehearsing, allows the company to issue the amount asked for, the proceeds to be divided thus: Improvement of plant, etc., $472,954.57; to make good depreciation, $134,545.53; expenses of sale and discount, $67,500.

THE OHIO CITIES GAS COMPANY have declared a dividend of 1¼ per cent preferred, payable Oct. 1 to stock of record Sept. 15.

THE MASSACHUSETTS LIGHTING COMPANIES report aggregate net sales for August, 1916, of $110,490, compared with $95,355 for August, 1915, an increase of $15,134, or 15.9 per cent, and for the two months ended Aug. 31, $211,483, compared with $184,173, the same period last year, an increase of $27,310, or 14.8 per cent.

THE LYNN GAS & ELECTRIC COMPANY reports the following earnings in comparison with the corresponding period of the preceding years:

	1916	1915	1914
Gross	$1,337,932	$1,246,127	$1,235,349
Net	454,271	400,110	366,724
Surplus	146,971	163,610	130,224

THE WORCESTER GAS LIGHT COMPANY reports the following earnings for the year ended June 30, as compared with the corresponding period of the preceding years:

	1916	1915	1914
Gross	$912,904	$841,508	$886,708
Net	190,651	125,282	122,512
Surplus	43,651	*14,718	*25,488

*Deficit.

THE AMERICAN GAS & ELECTRIC COMPANY has declared a regular quarterly dividend of 1½ per cent on preferred, and 2½ per cent on common stocks. The common dividend is payable Oct. 2 to holders of record Sept. 20, and the preferred is payable Nov. 1, to holders of record Oct. 20.

THE CAMBRIDGE GAS LIGHT COMPANY reports the following earnings, for the year ended June 30, as compared with the corresponding period of the preceding years:

	1916	1915	1914
Gross	$920,422	$861,653	$841,254
Net	232,712	176,409	190,146
Surplus	37,712	20,409	12,346

THE MALDEN & MELROSE GAS LIGHT COMPANY reports the following earnings, for the year ended June 30, as compared with the corresponding period of the preceding years:

	1916	1915	1914
Gross	$721,594	$690,746	$624,437
Net	229,254	205,388	176,504
Surplus	62,414	41,024	39,396

THE COLUMBIA GAS & ELECTRIC COMPANY reports gross earnings for August amounting to $584,587; increase, $69,412; net after taxes, $263,795; increase, $43,828; deficit after charges, $27,092; decrease, $42,940. Eight months' gross, $5,901,896; increase, $552,486; surplus after charges, $652,930; increase, $364,075.

THE DAYTON POWER & LIGHT COMPANY reports gross earnings for August amounting to $123,923; increase, 53.9 per cent; net, $44,461; increase 14 per cent; surplus, $10,556; against $11,756 in August, 1915. Operating ratio rose from 51.3 per cent in August, 1915, to 63.9 per cent in August, 1916.

NEWPORT NEWS & HAMPTON RY., GAS & ELECTRIC COMPANY reports gross earnings for July amounting to $100,828; increase, $10,717; net after taxes, $42,681; increase, $2,431; surplus after charges, $23,552; increase, $2,551.

THE REPUBLIC RAILWAY & LIGHT COMPANY reports gross earnings for August aggregating $395,579; increase, $74,786; net after taxes, $152,431; increase, $49,927; surplus after charges, $82,371; increase, $36,646; eight months' gross, $2,596,205; increase, $627,586; net, $1,072,752; increase, $322,716; balance after preferred dividends, $312,948; increase, $216,341.

THE CHARLESTOWN GAS & ELECTRIC COMPANY reports the following earnings for the year ended June 30, as compared with the corresponding period of the preceding years:

	1916	1915	1914
Gross	$469,753	$433,813	$422,327
Net	158,277	128,546	124,350
Surplus	68,277	38,546	34,350

THE UNITED GAS IMPROVEMENT COMPANY has declared a regular quarterly dividend of 2 per cent, payable Oct. 14 to stock of record Sept. 30.

Current Prices of Public Utility Securities.

	Bid	Asked
Adirondack Elec. P.	27	29
Adirondack Elec. P. pf.	81	83
American Gas	120	123
*American Gas & Electric	154	157
*American Gas & Electric pf.	49	51
American Light & Traction	378	382
American Light & Traction pf.*	110	112
American Power & Light	70	71
American Power & Light pf.	84	85½
American Public Utilities	42	47
American Public Utilities pf.	73	76
Amer. Water W. & Elec.	7½	8½
Amer. W. W. & E. part'g pf.	21	23
Amer. W. W. & E. 1st pf.	61	64
Carolina Pow. & Lt.	27	29
Carolina Pow. & Lt. pf.	97	100
Cities Service	307	310
Cities Service pf.	85¾	86¾
Colorado Power	25	26½
Colorado Power pf.	99½	102½
Commonwealth, Pr. Ry. & Lt.	62	64
Commonwealth, Pr. Ry. & Lt. pf.	83½	85½
Denver Gas & Electric gen 5s	96	98
Electric Bond & Share pf.	99½	100
Empire District El. pf.	88½	92½
Federal Light & Traction	10	13
Federal Light & Traction pf.	44	48
Gas & Electric Securities	250	300
Gas & Electric Securities pf.	95	100
Northern States Power	97	99
Northern States Power pf.	97	98½
North. Ont. Lt. & P.	15	18
North. Ont. Lt. & P. pf.	..	60
Ozark Power & Water	43	46
Pacific Gas & Electric	59	59½
Pacific Gas & Electric pf.	90	92
Republic Ry. & Light Co.	38½	39½
Republic Ry. & Light Co. pf.	73	76
*Standard Gas & Electric.	15	15½
*Standard Gas & Electric pf.	41¾	42½
So. Cal. Edison	90	93
So. Cal. Edison pf.	106	108
Tennessee Ry., Light & Power	10	11
Tennessee Ry. Light & Power pf.	48	50
Toledo Trac., Light & Power	48	53
Toledo Trac., Light & Power pf.	85	87
United Light & Railways	51	53
United Light & Railways 1st pf.	74	76
Western Power	20	21
Western Power pf.	69½	71

*Par value $50